

March 23, 2002

Colleagues:

The document that follows was originally designed to be printed in landscape orientation at 100% size. I give one of these outlines to each student. We are each on a strict Xerox "clicks" budget at my school so I decided to save some clicks by printing the document in portrait orientation at 75% size. One other advantage of this portrait orientation is that the outline can be read without turning your binder sideways. This size is still readable, but only just. If you don't have to conserve clicks and want to print at full size, but cannot manipulate this file into that shape, you can email me and I will send you my full size version (gzak@pacificcoast.net). I have set the headers to not appear on the first page of this document, so you may want to adjust that parameter if you tweak this and use it. Cutting out this preamble page should get the headers right.

This is the outline I am using at Reynolds Secondary School in Victoria for the PMA11 course. We are a semestered 8-12 school. Typically our first semester has about 88 or 89 useable class periods and our second semester has about 84 or 85 (not counting early dismissals for parent teacher interviews, FSA tests, accreditation surveys, assemblies, course selection classes, suicide awareness classes, careers day, earthquake drills, fire drills, false alarms, assemblies, report card distribution, yearbook distribution, textbook distribution, textbook collection, fees collection, locker allocation, locker inspection, locker cleanout, semester turnaround day, or the first 2 days of school in September as instructional time for mathematics). Math classes meet once each day for 80 minutes on Monday to Thursday and for 60 minutes on Friday.

In general I do one row of the outline per day. The first time I ran the course I knew I would not have enough time so I chose to put Chapter 1 at the end, since it is least needed for PMA12. Sure enough I didn't make it and, while it is a shame to leave it out since it is so useful for Principles students in terms of their real lives, I will probably never do it until someone shows me how to cram it all into the timetable I have to deal with. My choice will now be (after teaching the course four times) to start with Chapter 5 (Systems of Equations and Inequalities) since it is an easy way to review some basic algebra skills that many students are weak on. Some teachers stick in a self-designed unit on trig for review for those students going on to PMA12. I may do this in future.

The references to "Puzzle Sheets" scattered throughout the outline mean those of Steve and Janice Marcy in their series "Algebra with Pizzazz", available through most educational supply houses.

Feel free to transmogrify any aspect of this outline.

Enjoy!

Gary Zak

Credits:

The format and some of the contents were created by Gary Zak. Most of the content came from the efforts of Sue Haberberger and Linda Rajotte, gleefully expropriated by Gary Zak, who is very gratefully in their debt.

Date & Section	Title & Topics	Assignment	Club 12	√
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Principles of Math 11 - Outline of Assignments

Those students who want to extend themselves a bit or who are intending to take PMA12 should also try one or more of the “Club 12” questions, and at least *read* all the “extra bits” that are in all the math textbooks but the teachers never get time to cover “officially” in class.

Do not start the problems until you have understood the ideas from having listened in class and read the text, including the examples. Your job is to understand the math ideas involved there. You should do the problems to see how well you understood the ideas. Ask for the teacher's help when an example is unclear, not just when you are stuck on a question. Use the assignments to separate what you know from what you don't know so that you can ask about the stuff you don't know the next period.

I do not “mark” your assignments - you do from the back of the book. You also put tick marks when you are right and “X's” when you are wrong and you do your corrections - don't erase - best to leave the original error there in case you have to ask in class about it the next day. You only hand in the assignment when it is totally complete. I simply monitor whether you are doing the assignments. I give a “5” for “well done”, i.e. meeting all the checklist requirements listed below. You get a “0” for not handing one in. You get a “4, 3, 2, or 1” if some part or parts of the checklist are not followed and I don't want to keep handing it back.

Assignments are due the period following the lesson date. In many cases you will need to ask questions the following period about the previous period's assignment. Therefore there will be no late penalty. However, if you leave completion of assignments longer than a couple of days, you will just keep falling further and further behind and get discouraged and fail and lose the chance to make big bucks as an adult mathematician. Use the “√” section to keep track of completed work. Enter your assignment mark and test scores here so you will have a record of marks from which you can calculate your grade at any time. Read the assignment carefully. Some of these assignments may be partly or totally for bonus marks, to be done only if you want the bonus marks. Some of them have parts, however that must be done by everyone, so check carefully

Checklist for getting full marks on assignments:

first and last name in top right hand corner of top page?	full description (assignment, page, and question numbers) at top?
done readably on non-ripped looseleaf paper?	question numbers in margins? two columns maximum?
all pages in order? stapled together neatly?	multi-step questions in style of examples in text or your notes?
sketches shown for graphing calculator questions?	no significant erasures?
all questions marked with a tick, cross, or question mark?	all questions finally corrected and completed?

Abbreviations you could get on an assignment:

N.C.Y.	no credit yet - find out what I'm giving you a chance to fix, fix it, and hand it in again for credit
S.A.W.	show all work - for questions that have more than one step I expect you to show how you got your answer. If you used a calculator, fine, but show me what you did on the calculator by labelling the numbers you write down. If you used a graphing calculator, show a sketch and window sizes, and label the curves.
M.C.R.	mark, correct, and resubmit
N.F.	not finished - I may just give you a low mark or I may hand it back and give you a chance to finish it
S.N.	section number - you didn't note what chapter and section it is

Date & Section	Title & Topics	Assignment	Club 12	√
Review	Introduction to the course – expectations, assignments, tests, etc. Factoring, graphing functions (linear and quadratic), Zero Principle	Puzzle sheets: p.95 (Old Lawyers), p.101 (Moving Words), p.175 (Baby Porcupine), p.176 (Bucket), p.177 - 179 (Sketching Functions), p.180 (Lin.2Quad.)		
Review	Equations & Graphs and perhaps start demo of graphing calculators	More time for review and puzzle sheets		
Intro	Graphing a function - Pages 84 to 87, done in class <ul style="list-style-type: none"> • Projectile Motion • Graphing a quadratic function using a graphing calculator • <i>Inputting equation, trace feature, setting window dimensions, using the Calculate menu to find maximum, y-intercept, and zeros.</i> 	p. 84 #1, 2, 3, 4, 5, 6, 7 - in class only - nothing to hand in	8	

CHAPTER 5 - SYSTEMS OF EQUATIONS AND INEQUALITIES

* indicates graphing calculator is necessary

Intro	Graphs of lines <ul style="list-style-type: none"> • Review slope/intercept form of a line • Review basic shapes of graphs and translations • Review substitution, then solving 	Puzzle Sheets p. 148 (Cryptic), p. 153 (Duck Steals), p.154 (Ape), p.155 (Bank)		
5.1	Solve Systems of Equations by Graphing Now use technology	Read pp. 302 - 305 and do #1aceg, 2ab, 7, 8, 9all, 13, Read pp. 308 - 309 and do #*2abcd, *3ab		
5.2	Solving Linear Systems by Addition or Subtraction	Read pp. 310 - 315 and do #2ace, 3ace, 5defg, 6aeg, 8	10, 14, 15	
5.3	Number of Solutions of Linear System <ul style="list-style-type: none"> • Number of Solutions of a Linear System • Consistent system <ul style="list-style-type: none"> • One solution – intersecting lines • Infinitely many solutions – coincident lines • Inconsistent <ul style="list-style-type: none"> • No solution – parallel lines 	Read pp. 319 - 321 and do #4a all, 6, 7		
5.4	Solving Systems by Substitution	Read pp. 323 - 325 and do #2aceg, 4abcd, 5ac, 8ac, 9ac, 10ac, 14	11ac, 15, 18, 19	
5.5	Problems Involving Linear Systems	Read pp. 333 - 334 and do #1, 3, 5, 7, 11, 13, 15, 18	19 - 23	
5.6	Solving Linear Systems in Three Variables <ul style="list-style-type: none"> • algebraically 	Read pp. 337 - 341 and do #3ac, 5c, 6c, 7a, 14		
Optional	Solving Linear Systems in Three Variables <ul style="list-style-type: none"> • with technology 	Optional Read pp. 344 - 346 and do # (use matrices)	*5, *7, *8	
5.7	Graphing Linear Inequalities in Two Variables	Read pp. 348 - 350 and do #4aceg, 6, 8aceg		
Optional		Optional	1ace, 3c, 4a, 7b, 9	
5.8	Graphing Systems of Linear Inequalities	Read pp. 352 - 354 and do #		
	Review of Chapter 5 - not to be handed in.	These are suggestions only - 1b, 3b, 5, 6ac, 7, 10ac, 12ac, 13c, 15, 17, 18ac, 21, 22ce	12e, 25b, 26ac	
	Chapter 5 Test			

CHAPTER 2 - QUADRATIC FUNCTIONS

(A graphing calculator is very useful throughout this chapter.)

2.1	Graphs of Quadratic Functions <ul style="list-style-type: none"> • A quadratic function has equation $y = ax^2 + bx + c$ (graph is a parabola) • Identify vertex, axis of symmetry, x- and y-intercepts (Pages 88–92) • How to graph a functions by making a table of values and graph paper • Compare by graphing a function using a graphing calculator 	Read pp. 88 - 93 and do #1, 2, 4, 6 abc, 7	8	
2.1	Graphs of Quadratic Functions - more time <ul style="list-style-type: none"> • Solving a quadratic equation by: <ul style="list-style-type: none"> • factoring • graphing • Write the equation of a quadratic function given zeros 	9a, 11 ab, 12, 13, 14, 15		
2.2	Modelling Real Situations Using Quadratic Functions	Read pp. 101 - 104 and do #1, 2, 3, 5		

Date & Section	Title & Topics	Assignment	Club 12	√
2.3	Graphing $y = a(x-p)^2 + q$ (Standard Form) <ul style="list-style-type: none"> • identify vertex, axis of symmetry, plot points on grid • Transformations – translations, expansions, compressions • Determining the equation of a quadratic function given the graph or the parameters of the function 	Read pp. 109 - 115 and do #4, 7, 9ace, 10ace, 12ac, 14ac, 15	18, 20	
2.4	Graphing $y = ax^2 + bx + c$ (General Form) <ul style="list-style-type: none"> • changing a quadratic equation from $y = ax^2 + bx + c$ to $y = a(x-p)^2 + q$ by completing the square 	Read pp. 122 - 123 and do #1, 2, 3, 4ace, 7ac, 8ac, 10 all, 13ac		
2.5	Maximum and Minimum Problems <ul style="list-style-type: none"> • figuring out the function given the information in an English sentence 	Read pp. 127 - 129 and do #1, 2, 3, 6, 8, 10, 11, 13, 14	15, 16	
2.6	The Inverse of a Linear function <ul style="list-style-type: none"> • $f^{-1}(x)$ is the inverse function of $f(x)$ 	Read pp. 133 - 135 and do #1, 2, 3ab, 5		
2.7	The Inverse of a Quadratic function <ul style="list-style-type: none"> • The inverse of a quadratic is not necessarily itself a function 	Read pp. 138 - 139 and do #1, 2af, 3		
	Review of Chapter 2 - not to be handed in.	Selections from p. 148, 149		
	Chapter 2 Test			

CHAPTER 3 - POLYNOMIAL AND RATIONAL FUNCTIONS

* indicates graphing calculator is necessary

Intro	Exploring Polynomial Functions	p. 154 - 155 *(1 to 6) (done in class)		
3.1	Polynomial Functions <ul style="list-style-type: none"> • Linear, quadratic, cubic, quartic, quintic functions • Properties of graphs of polynomial functions <ul style="list-style-type: none"> • even and odd degree • end behaviour • symmetry 	Read pp. 156 - 160 and do #1, 2, 5, 6a		
3.2	Properties of the Graphs of Polynomial Functions <ul style="list-style-type: none"> • Coordinates of maximum and minimum points • Domain and range • Inverse of a polynomial function • Using a graphing calculator to Calculate Maximum and Minimum 	Read pp. 163 - 165 and do #1, *2, *3ac, *4ac, 5		
3.3	Relating Polynomial Functions and Equations (no calcs) <ul style="list-style-type: none"> • Write the equation of a quadratic function given zeros ("x"intercepts of a graph) • Solving a polynomial equation by factoring 	Read pp. 167 - 172 and do #1, 2abc, 3ac, 5, 6abc, 7abd, 8acefg, 10, 11, 12c, 13acegi, 14acegi		
3.4	Solving Polynomial Equations (gr calcs) <ul style="list-style-type: none"> • Solving polynomial equations by graphing <ul style="list-style-type: none"> • using graph paper • using a graphing calculator 	Read pp. 178 - 179 and do # *1, *2ac, *3ac, *4ac, *5ac, *8	9, 10	
3.5	Modelling Real Situations Using Cubic Functions <ul style="list-style-type: none"> • Using a Graphing Calculator to find maximum point – interpreting coordinates 	Read pp. 182 - 185 and do # *1, *2, *3, *4, *6	9	
	Graphing Rational Functions <ul style="list-style-type: none"> • Exploring with a Graphing Calculator <ul style="list-style-type: none"> • investigating $y = \frac{1}{x}$ • investigating other rational functions e.g. $y = \frac{1}{x^2 - x - 6}$ 	Pages 189 – 190 #1 – 5 (done in class)		
3.6	Reciprocal Functions <ul style="list-style-type: none"> • asymptotes • domain restrictions 	Read pp. 191 - 194 and do #1, 2ace, *3ace, *5, *7ac, *9	10, *12	
3.7	Rational Functions	Read pp. 198 - 199 and do #1, 2, *5 - 8; ac, *10 a) i, ii, b)	3, *14	
Optional (Bonus)		Optional (Bonus)		
3.8	Modelling Real Situations Using Rational Functions	Read pp. 203 - 206 and do #1, 3 (Bonus)		
3.9	Composition of Functions	Read pp. 214 - 216 and do #1-5(all), 6ace, (9-11)ac, 7k 13, 17,	14, 18	
	Review of Chapter 3 - not to be handed in.	Selections from p. 221, 222		
	Chapter 3 Test			

Date & Section	Title & Topics	Assignment	Club 12	√
CHAPTER 4 - ANALYSIS OF EQUATIONS AND INEQUALITIES				
* indicates graphing calculator is necessary				
4.1	Solving Quadratic Equations by Using a Formula <ul style="list-style-type: none"> Solving Quadratic Equation $ax^2 + bx + c = 0$ by using a formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ 	Read pp. 226 - 231 and do #1, 2, 3, 4ace, 5abcd, 6, 7, 8, 9, 10, 11, 12b	13b, 16, 17	
4.2	The Nature of the Roots of a Quadratic Equation (Discriminant) <ul style="list-style-type: none"> The Discriminant $D = b^2 - 4ac$ <ul style="list-style-type: none"> $- D > 0$ two different real roots $- D = 0$ two equal real roots $- D < 0$ no real roots Graphical discussion 	Read pp. 240 - 243 and do #1, 2, 3, 6a, 7a, 8a Puzzle Sheet p. 223 (Soil Erosion)		
4.3	The Remainder Theorem <ul style="list-style-type: none"> Long Division (reviewed) When a polynomial in x is divided by $x - k$, the remainder is equal to the number obtained by substituting k for x in the polynomial. (That is $f(k)$ is the remainder) 	Read pp. 251 - 253 and do #2 - do by long division. Write division statement. Then also do 1, 3, 5, 6, 7, 8	9	
4.4	The Factor Theorem When k is substituted for x in a polynomial in x , and the resulting value is 0, then $x - k$ is a factor of the polynomial. (That is, if $f(x) = 0$, then $x - k$ is a factor) <ul style="list-style-type: none"> The Factor Property If a polynomial in x has any factor of the form $x - k$, then k is a factor of the constant term of the polynomial.) Long Division Factoring and Solving Polynomial Equations using the Factor Property / Theorem 	Read pp. 255 - 258 and do #1, 2, 3, 4, 5, 8, 9ace, 11ab, 12ace, 13ace, 14ace, 15	16, 17a, 19	
4.5	Solving Polynomial Inequalities <ul style="list-style-type: none"> Think graphically – work on a number line 	Read pp. 261 - 264 and do #1 all, 2ace, 4aceg, 5, 9ace, 10ace, 11ac	8, 12	
4.6	Solving Rational Equations and Inequalities	Read pp. 267 - 273 and do #1ace, 2ace, 4ace, 10c, 11ac, 12ac, 13ac	16a	
4.6	More time	Inequalities: 5ac, 7ac, 9, 15a		
4.7	Solving Radical Equations and Inequalities <ul style="list-style-type: none"> Extraneous Roots 	Read pp. 278 - 283 and do #(1, 3, 8, 14) "odds only" Puzzle Sheet p. 217 (Nuclear Physics)	16ac	
4.7	More time	Inequalities: 2ace, 4ace, (19 bcd - use graphs)	19e	
4.8	Solving Absolute Value Equations and Inequalities <ul style="list-style-type: none"> Distance method for simple equations More complicated questions – solve Graphically 	Read pp. 287 - 293 and do #1, 2, 3abcde, 4, 5, 6	11abc, 13	
	Review of Chapter 4 - not to be handed in.	These are suggestions only - 1, 2, 3ef, 4abc, 6a, 7a, 8a, 9, 10, 11, 12ab, 13a, 14ac, 18ac, 19ac, 20ab, 22a, 25ab, 26a	16a, 26bd	
Chapter 4 Test				

CHAPTER 6 - REASONING AND GEOMETRY				
"Geo 11" refers to the Zoe Wakelin Geometry 11 handout package: "S3" would mean "Student Page 3"				
6.1	Inductive Reasoning Geo 11	Read pp. 370 - 371 and do #3,6 p. S7 #1, 2, 3, 4		
6.2	Deductive Reasoning Geo 11	Read pp. 373 - 375 and do #1all, 2acd, 3all, 5, 7, 8, 9, 11, 12 (Some answers are not in the text – classroom discussions will be required for answers to #5, 7, 8, 9, 11, 12) p. S8 #6, 7		
6.3	Conjectures and Counter-examples	Read pp. 381 and do #1, 3, 4, 6, 7 Extra Assignment 1: Prove If n is even, then n^2 is even. (hint: think "factors")		
6.4	Statements Involving "not", "and", and "or"	Read pp. 385 - 390 and do #3, 6, 7, 9, 11-15 odds, 16, 17 (Some answers are not in the text – classroom discussions will be required for answers to #11-15 odds) (Venn diagrams) 4, 19, 20, 22	18 21	

Date & Section	Title & Topics	Assignment	Club 12	√
6.5	Statements Involving "If...then" (Implication)	Read pp. 395 - 397 and do #3, 4-6 odds, 9, 10-11 odds Extra Assignment 2: State and prove the converse of Extra Assignment 1 (in 6.3 above). You should all try some of the Logic Puzzles on p. 410 - 411	16, 17	
6.6	Congruent Triangles <ul style="list-style-type: none"> • CPCTC • Review of Parallel Lines Theorem: Alternate Interior Angles, Corresponding Angles, Co-Interior Angles 	Read pp. 402 - 405 and do #1, 2, 3, 5, 6-10, 11-20 (Some answers are not in the text – classroom discussions will be required for answers to #5, 6-10, 11-20)		
6.7	Indirect Proof Geo 11	Read pp. 412 - 414 and do #1, 2, 3, 5, 7, 9 (Some answers are not in the text – classroom discussions will be required for answers to #1, 2, 3, 5, 7, 9) p. S8-S9 #8, 9, 10		
	Review of Chapter 6 - not to be handed in.	These are suggestions only - 7, 8, 9, 10, 11, 12, 14, 15, 17, 19		
	Chapter 6 test			

Chapter 7 - Properties of Angles and Chords

Chapter 8 - Other Circle Properties

"Geo 11" refers to the Zoe Wakelin Geometry 11 handout package: "S3" would mean "Student Page 3"

7.1	Circle Concepts <ul style="list-style-type: none"> • chord, segment, radius, sector, minor arc, major arc, diameter, centre, sector angle 	Read pp. 426 - 428 and do #1, 10 (Some answers are not in the text – classroom discussions will be required for answers to #10b)		
7.2	Investigating Properties of Chords Three Chord Properties <ul style="list-style-type: none"> • the line through the centre of a circle that bisects a chord is perpendicular to that chord • the perpendicular from the centre of a circle to a chord bisects the chord • the perpendicular bisector of any chord contains the centre of the circle Geo 11 pkg	Read pp. 432 - 435 and do #1, 2ab, 4, 5, 8, 9a, 13, 15 p. S11-S12 #4, 5, 6, 7, 8, 10, 12		
7.4	Investigating Properties of Angles in a Circle Angle Properties <ul style="list-style-type: none"> • inscribed angle on a diameter = 90° • inscribed angles on the same arc are = • central angles = 2 times inscribed angle Geo 11 pkg	Read pp. 448 - 451 and do #1, 2, 5, 6, 7, 8a, 9 (Some answers are not in the text – classroom discussions will be required for answers to #7b) p. S14-S15 #5 to 20		
	Paradoxes and Proof	Everyone read pp. 456 and 457 and then think about how weird the world is!		
8.1	Investigating Cyclic Quadrilaterals Cyclic Quadrilateral Properties <ul style="list-style-type: none"> • opposite angles of a cyclic quad are supplementary • if opposite angles of a quadrilateral are supplementary then the quadrilateral is cyclic • each exterior angle of a cyclic quadrilateral = opposite interior angle Geo 11 pkg	Read pp. 470 - 472 and do #1, 3, 5 p. S16 #1 to 10		
8.3	Investigating Tangents to a Circle Tangent Properties <ul style="list-style-type: none"> • tangent is perpendicular to the radius • tangents from an external point are equal Geo 11 pkg	Read pp. 480 - 484 and do #1, 2, 4, 5, 6, 8, 9 p. S17-S18 #1 to 4, 6, 7	10, 11	

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8.5	The Tangent-Chord Theorem Tangent-Chord Theorem • angle between tangent and chord = inscribed angle on opposite side of chord Geo 11 pkg	Read pp. 497 - 500 and do #1, 2, 4, 8, 9, 13 (Some answers are not in the text – classroom discussions will be required for answers to #13) p. S18-S19 #8 to 17	10, 12, 14	
8.6	Angles and Polygons • in any polygon with n sides, the sum of the angles is $180^\circ n - 360^\circ$ • in a regular polygon with n sides, each angle measures $180^\circ - 360^\circ/n$	Read pp. 506 - 511 and do #1 to 9 (Some answers are not in the text – classroom discussions will be required for answers to #5, 6b, 8b)		
	Review of Chapters 7 and 8 - not to be handed in. All Circle Properties - Geo 11 pkg Proofs - Geo 11 pkg Problem Solving - Geo 11 Pkg Special Triangles - Geo 11 pkg	Selections from p.464, 465 and p.515, 516 p. S20-S22 Selected questions p. S23-S28 Selected questions p. S29-S30 Selected questions p. S36-S38 Selected questions		
	Chapter 7 and 8 test			

CHAPTER 9 - Coordinate Geometry

9.1	The Equation of a Circle • Review distance formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ • Review midpoint formula: $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$	Read pp. 522 - 524 and do # 1, 2, 3a, 4, 5, 6, 8, 9, 10a,b, 11– 13, 17		
9.2	Problems Involving Circles and Lines • Geometric and Algebraic solutions to systems • Review <i>Slope-Intercept</i> form of Line $y = mx + b$ • Review determining equation of a line <i>Point-Slope</i> form $y - y_1 = m(x - x_1)$ • Review slopes of perpendicular lines are negative reciprocals	Read pp. 529 - 531 and do #1, 2, 3, 4a, 5 to 9, 11, 12, 13 (Some answers are not in the text – classroom discussions will be required for answers to #5c)	16	
9.3	Problems Involving Points and Lines	Read pp. 536 - 539 and do #1, 2, 3, 4, 5a, 6, 7, 8		
9.4	Using Coordinates to Verify Conjectures	Read pp. 545 – 547		
9.5	Using Coordinates to Prove Conjectures	Read pp. 550 – 552 and do #1, 3, 6, 7, 10		
	Review of Chapter 9 - not to be handed in.	Selections from p. 558, 559		
	Chapter 9 test			

CHAPTER 1 - Mathematics of Finance

To be done if time allows.

1.1	Savings and Credit: Simple Interest	To be determined		
1.2	Compound Interest	To be determined		
1.3	Compounding Periods Less than One Year	To be determined		
1.4	Comparing Financial Options	To be determined		
1.5	Earning a Living	To be determined		
1.6	Taking Home a Paycheque	To be determined		
1.7	Determining Expenses	To be determined		
1.8	Preparing a Budget	To be determined		
1.9	Investigating Mortgages	To be determined		